

# Armored Multi-Purpose Vehicle (AMPV) Industry Day

24 April 2012  
Sterling Heights, MI





# Agenda

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# Disclaimer

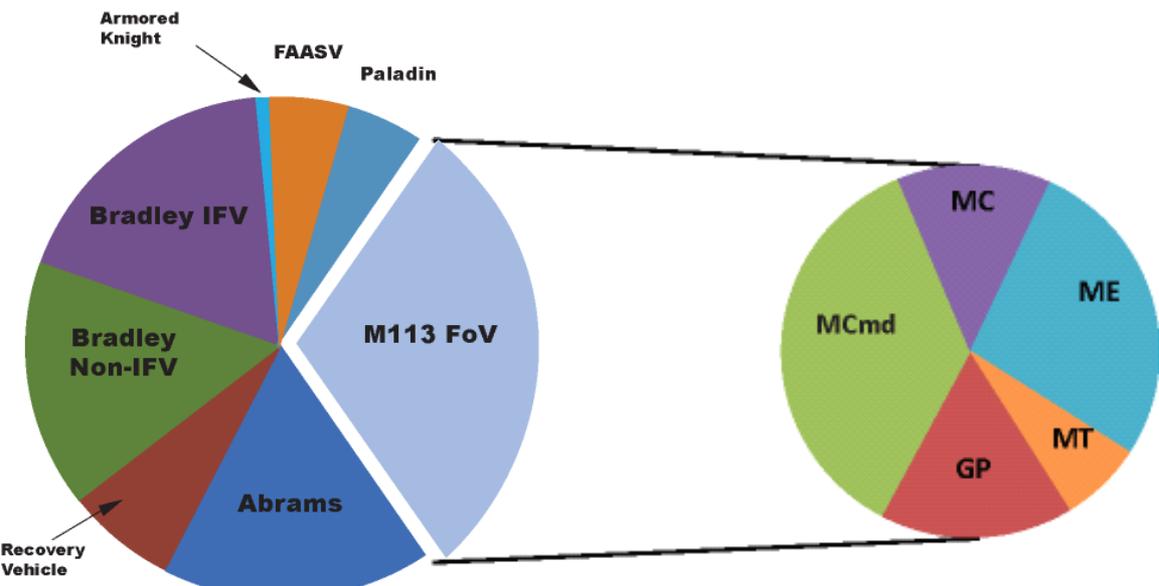
- **The Armored Multi-Purpose Vehicle program is a pre-Major Defense Acquisition Program (MDAP) that has just executed its Materiel Development Decision (MDD) and entered Materiel Solutions Analysis (MSA)**
- **The Analysis of Alternative (AoA) is ongoing**
- **This is the first of several industry engagements enroute to Request for Proposal (RFP) release**
- **Questions may be written on the 3x5 comment cards and will be posted with answers to the website**

**All information on the AMPV program is preliminary and is subject to change**



# Background / Problem

The M113 FoV has inadequate survivability and force protection, lacks the space, weight, power, and cooling (SWAP-C) to incorporate future technologies and the inbound Army's network. An obsolete system, these platforms no longer provide Commanders with viable capabilities to maneuver across the full breadth of the battlefield. The Army is applying time and resources to platforms that are no longer a force multiplier



*Given the scope and scale of the M113 FoV in an HBCT, M113 replacement is a significant investment decision for the Army*





# Capability Gaps of M113 Fleet

- **Mobility**
  - **No power or suspension upgrades to offset added weight of armor**
    - Unable to use Reactive Armor Tiles
    - Cruising range and acceleration reduced
- **Force Protection/Survivability**
  - **No Fire Suppression System**
    - Increased chance of injury to Soldier during vehicle fire
  - **Insufficient Armor**
    - Increased chance of casualties for Soldiers
  - **Insurgent use of IEDs highlighted vehicle's vulnerability**
  - **Decreased M113 FOV use with theater maturation and MRAP fielding**
  - **Majority of HBCTs deployed to OIF with reduced M113 FOVs since 2007**
- **Interoperability**
  - **M113 requires significant upgrades to accept future network capabilities**
- **Maintainability/Sustainability: Average age of fleet = 13 years**



# MDD Direction

- **Approval to begin AMPV Analysis of Alternatives (AoA)**
  - **Alternatives include:**
    1. Base case, M113 FoV
    2. Current/Modified capital assets (Bradley, M113 upgrades, MRAP, SBCT)
    3. Other NDIs
    4. New start developmental vehicles (e.g. GCV, JLTV)
    5. Combination of above
  
- **AMPV designated as a pre-Major Defense Acquisition Program**
  
- **System provided affordability target**
  
- **Follow up with Defense Acquisition Board 4QFY12 to define program strategy**



# Stakeholders



PM HBCT



AMPV



PEO GCS



PM FBCB2



PM AFATDS/FOS



PM MRAP  
- Caiman HAGA



PM AMEDD



PM CREW



OSD-DOTE  
OSD- ATL



MCOE



PM CPS&I



ASA(ALT)



MRMC



PM CSW



ATEC



PM Mortars



PD Mounted  
Maneuver Support



FCOE



Signal Center  
MCcmd COE



# Program Overview

- **AMPV replaces M113s in 5 mission roles in the Heavy Brigade Combat Teams**
  - General Purpose (GP)
  - Mortar Carrier Vehicle (MCV)
  - Mission Command (MCmd)
  - Medical Evacuation Vehicle (MEV)
  - Medical Treatment Vehicle (MTV)
- **Intent is to replace all mission roles simultaneously with one or more solutions**
- **Vehicle / Integration program – not a mission equipment package development program. Leverage existing M113 MEP where possible**
- **Must be quick, affordable**
- **Solution for M113 replacement for Echelons Above Brigade will be a later decision with potentially different requirements**



# Requirements Overview

- **The Capability Development Document (CDD) is in staffing – pending revision based on AoA**
- **Following charts share some insights to date**
- **Expect tiering of requirements in RFP**
  - Tier 1: Must have, non-tradeable
  - Tier 2: Allow for trade space
  - Tier 3: Can be deferred or Objective



# Projected Quantities

	per BCT			HBCT	Total	TRADOC / Test	Total Vehicles by quantity
GP	19	x	24	456	47	503	
MCV	15	x	24	360	43	403	
MCmd	41	x	24	984	92	1076	
MEV	31	x	24	744	75	819	
MTV	8	x	24	192	21	213	
						Total	3014

- Procured at rate of 2-3 BCTs/year at Full Rate Production (FRP)

\* Assumes current force structure: Army Future Force Structure TBD



# General Purpose Insights

- **1SG Tasks:**

- Conduct Logistics Package (LOGPAC) escort
- Conduct emergency resupply
- Conduct Casualty Evacuation (CASEVAC)
- Provide security for Medical Evacuation (MEDEVAC)

- **When conducting CASEVAC or escorting ME in Combined Arms Maneuver (CAM):**

- Maneuvers to point of injury as situation develops; avoiding medium caliber and Anti-tank Guided Missile (ATGM) threats
- Positions vehicle next to M1/M2, drops ramp, and transfers supplies/casualties between vehicles
- Returns to casualty collection point or Combat Trains Command Post (CTCP)
- Prefers proximity to point of injury over off-road speed

- **When conducting Wide Area Security (WAS) activities:**

- Maneuvers with combat vehicles during tactical operations
- Serves as an escort for logistics convoys and medical evacuation
- May be tasked to support high-profile missions (election support)



- **Requires off-road mobility comparable to M1/M2**

- **Requires protection comparable to combat vehicles against most likely Direct Fire (DF), In-Direct Fire (IDF), and underbelly threats**



# Specific GP Requirements

## ▪ General Purpose:

- 2 Crew
- 6 Passengers
- Reconfigure to carry one litter
- Mount crew served weapon
- Integrate:
  - 2 Joint Tactical Radio System (JTRS) Handheld, Manpack and Small Form Factor (HMS) or 2 Single Channel Ground and Airborne Radio System (SINCGARS)
  - Vehicle Intercom (VIC)-3
  - Warfighter Information Network – Tactical (WIN-T)
  - Driver's Vision Enhancer (DVE)
  - DUKE v3
  - Force XXI Battle Command Brigade and Below (FBCB2)/ Blue Force Tracker (BFT)



# Medical Evacuation Insights

## ▪ Medical Evacuation Tasks:

- Conduct MEDEVAC from point of injury (POI) to forward/main aid station (FAS/MAS) and on to ambulance exchange point (AXP)
- Conduct medical supply replenishment

## ▪ Maneuvers with the GP to conduct MEDEVAC

## ▪ When conducting CAM activities:

- Maneuvers to point of injury as situation develops; avoiding medium caliber and ATGM threats
- Positions vehicle next to M1/M2, drops ramp, and transfers supplies/casualties between vehicles
- May carry casualties to either FAS/MAS or AXP

## ▪ When conducting WAS activities:

- Maneuvers with combat vehicles during tactical operations, patrols, and quick reaction forces (QRF) to provide on-site medical care/evacuation
- May be tasked to support high-profile missions (election support)



## ▪ Requires off-road mobility comparable to M1/M2

## ▪ Requires protection comparable to combat vehicles against most likely DF, IDF, and underbelly threats



# Specific MEV Requirements

## ▪ Medical Evacuation Vehicle:

- 3 Crew
- 6 ambulatory patients or 4 litter patients or 3 ambulatory and 2 litter patients
- Integrate:
  - 2 JTRS HMS
  - VIC-3
  - DVE
  - DUKE v3
  - FBCB2/BFT
- Storage for Medical Equipment Sets (MES)
- Environmental cooling



# Medical Treatment Insights

- **Medical Treatment Tasks:**
  - Serve as the forward aid station (FAS) and main aid station (MAS)
  - Serve as the battalion aid station (BAS); and redundant FAS/MAS capability
- **FAS/MAS is co-located with the combat trains command post (CTCP)/BN TOC**
- **When conducting CAM activities:**
  - Within 2-4 Km of combat vehicles
  - Maneuvers with MCmd vehicles and wheeled support vehicles
  - Located off-road to avoid detection by threat, specifically avoiding medium caliber and ATGM threats
  - FAS and MAS may separate to jump forward
- **When conducting WAS activities:**
  - Will only leave the FOB for pre-planned operations
  - Will maneuver with security escort on a secured route



- **Requires mobility similar to vehicles in CTCP; able to traverse slopes and poor soil conditions**
- **Requires protection against small arms and IDF threats**



# Specific MTV Requirements

- **Medical Treatment Vehicle:**
  - **4 Crew**
  - **One litter patient**
  - **Integrate:**
    - 2 JTRS HMS
    - VIC-3
    - DVE
    - DUKE v3
    - FBCB2/BFT
  - **Storage for Medical Equipment Sets (MES)**
  - **Environmental cooling**



# Mortar Carrier Insights

- **Mortar Carrier and Fires Direction Cell (FDC) Tasks:**
  - Provide organic indirect fires (120mm mortar) for the HBCT
- **When conducting CAM activities:**
  - Travels on unexposed routes, moving through vegetation, frequent gap crossings, and avoiding roads
  - Vehicle positions to avoid medium caliber and ATGM threats
  - Primarily operates autonomously, but will occasionally be co-located with maneuver or scout assets
- **When conducting WAS activities:**
  - Supports a wide array of activities, maneuvering off the FOB frequently
  - Will travel on roads with security escorts



- Requires off-road mobility comparable to M1/M2
- Requires protection against most likely IDF and DF threats
- Requires a basic level of UB protection



# Specific MCV Requirements

## ▪ Mortar Carrier Vehicle:

- 2 Crew
- 2 Mortar crew
- Mount existing 120mm Mortar; 69 rounds of 120mm
- Integrate:
  - 2 JTRS HMS
  - VIC-3
  - DVE
  - DUKE v3
  - FBCB2/BFT
  - M95 Mortar Fire Control System (MFCS)
  - Advanced Field Artillery Tactical Data System (AFATDS)



# Mission Command Insights

- **TACs move forward with lead combat elements**
  - Positioned ~ close behind lead combat assets
  - Uses proximity to maneuver elements and mobility as protection
  - Will reposition to avoid medium caliber and ATGM
- **TOC/CTCP are positioned behind to forward line of troops**
  - Utilizes terrain such as draws for protection
  - Will emplace antenna's on higher ground (ridgeline) for improved connectivity
  - Will maneuver on same off-road terrain as combat vehicles to avoid threat
  - BN TOC may separate from wheeled vehicles when moving on the objective to maintain connectivity
  - BN TOC/CTCP is positioned in elevated area, 2-4 Km behind lead elements
  - BDE TOC is positioned 10-20 Km behind lead elements and primarily maneuvers with wheeled assets
- **In a WAS environment, only the TAC vehicles will leave the FOB to conduct mission support. Even then it is infrequent and pre-planned**

## BN/BDE TAC, BN TOC

- Requires off-road mobility comparable to M1/M2
- Requires protection comparable to combat vehicles against most likely DF, IDF, and underbelly threats

## BDE TOC/ CTCP

- Requires off-road mobility to traverse slopes and poor soil conditions. Primarily maneuvers with wheeled vehicles
- Requires protection against most likely small arms and IDF. Little exposure to underbelly threats



# Specific MCcmd Requirements

## ▪ Mission Command:

- 2 Crew
- 2 Operators
- Mount crew served weapon
- Integrate:
  - 1 JTRS MNVR
  - 2 JTRS HMS
  - VIC-3
  - WIN-T
  - DVE
  - DUKE v3
  - FBCB2/BFT
  - MFCS
  - Army Battle Command Systems (AFATDS, DCGSA, etc)



# Estimated Power Requirements



Component	Power Requirement (w)				
	GP	ME	MC	MCmd	MT
<b>Network</b>					
HMS Manpack (radios)	600	300	300	900	300
WIN-T (SNE)	1,000	-	-	-	-
WIN-T (PoP)	-	-	-	1,700	-
FBCB2 (plus DAGR)	76	76	76	76	76
MNVR*	-	-	-	1,200	-
<b>Electronic Warfare</b> (Crew 3 / DUKE; Gunshot Detection)	1,442	1,442	1,442	1,442	1,442
<b>Mission Equipment Package</b>	83	745	493	648	1,320
<b>Total</b>	<b>3,201</b>	<b>2,563</b>	<b>2,311</b>	<b>5,966</b>	<b>3,138</b>
<b>HVAC**</b>	9,000 Electronics only	15,000 Electronics & crew compartment	- Not Required	10,000 Electronics only	15,000 Electronics & crew compartment
<b>Total</b>	<b>12,201</b>	<b>17,563</b>	<b>2,311</b>	<b>15,966</b>	<b>18,138</b>

\* JTRS MNVR is a replacement to GMRS (cancelled program). MNVR is a 2xchannel radio vs. GMRS which was a 4xchannel radio. MNVR exact power consumption is currently unknown (1200w is half previous GMRS power draw).

\*\* HVAC Approximation only. Specific cooling requirement may vary depending on vehicle interior volume, location of electronic equipment, choice of point or area cooling solution, etc...



# Summary of Mission Roles (General)



## ▪ Mobility:

### – Mobility similar to combat vehicles:

- GP & ME – Conduct resupply, CASEVAC, and MEDEVAC missions along side of combat vehicles
- MC – Travels along the same terrain as the combat vehicles to provide organic indirect fire support
- MCcmd (BDE TAC, BN TAC/TOC) – Travels along the same terrain as the combat vehicles within close proximity of combat vehicles to conduct mission command

### – Mission roles where decreased mobility may be acceptable:

- MCcmd (BDE TOC) – Located 10-20 Km behind the lead elements. Generally moves with wheeled vehicles, may be able to accept risk with mobility
- MT – Located at the CTCP or BDE area, may be able to accept risk with mobility

## ▪ Force Protection:

### – Force protection similar to combat vehicles:

- GP & ME– Maneuvers in close proximity to combat vehicles, subject to similar threat, but avoids medium caliber and ATGM when possible
- MCcmd (BDE TAC, BN TAC/TOC) – Maneuvers in close proximity to combat vehicles and subject to most likely small arms, IDF, and underbelly threats
- MC – Maneuvers autonomously, subject to similar threats, but reduced exposure to medium caliber and ATGM threats due to positioning

### – Mission roles where decreased force protection may be acceptable:

- MCcmd (BDE TOC) – Located 10-20 Km behind the lead elements, subject to ambush type threats and IDF
- MT – Co-located with support assets, subject to ambush type threats and IDF



# AoA Insights (Mobility)



- **Some mission roles require capabilities comparable to combat vehicles (Abrams and Bradley)**
- **Mobility Requirement driven by Cross Country Mobility**
  - Capability divided into three separate terrain profiles (Hilly (wet/dry/snow), Desert (dry/sand) and Mountainous (wet/dry))
- **Potential for different levels of mobility capabilities for some mission roles (MT and select MCmd vehicles at Brigade level)**
  - Quantities equate to ~16% of the M113 FoV fleet



# AoA Insights (Protection)

## Priorities for Protecting Occupants

**Maximize Protection** by minimizing (in priority order) the following:

- I. Violent reactions of energetic materials;
- II. Sustained fires;
- III. Perforation of personnel volume;
- IV. Loss of survivability systems;
- V. Loss of mobility;
- VI. Loss of command, control, and communications;
- VII. Loss of firepower

## Ballistic Vulnerability Reduction Design Principles (ABCs)

**Add** protection with armor (passive, reactive), spall liners (with stand-off), self-sealing fuel cells, fire prevention, etc

**Bury** critical components behind heavy structure or non-critical components

**Concentrate** non-redundant critical components together to minimize presented area and P(hit)

**Duplicate** and separate critical components so a vehicle is unlikely to lose a function from a single shot

**Eliminate** unnecessary critical components (e.g., two components where one will suffice)

**Favor** the natural aim point – place critical components/people away from the natural aim points of the vehicle

## Design Principles for Underbody Protection

- Direct blast energy away from the vehicle
- Prevent breach of the vehicle
- Limit acceleration of the vehicle
- Dampen translation to the occupants
- Protect crew from lethal debris
- Minimize floor velocities
- Elevate occupants feet

## Examples of Good Design Practice



# Commonality

- **Some level of system commonality will be a CDD requirement**
- **Emphasis will be on soldier-reparable components that affect unit logistics or are cost drivers**
- **Commonality is valuable:**
  - **Between mission role variants in AMPV**
  - **With other fielded Army systems**



# Other Requirements

- **Known Restrictions**
  - No Halon
- **Contractors need access to classified data**



# Affordability Target

- Target: **\$1 – 1.7M** Average Unit Manufacturing Cost (AUMC)
  - (exclusive of Government Furnished Materiel)
  
- Expect to Apply DoD “Better Buying Power” Initiatives, examples:
  - Affordability as a requirement
  - “Should cost” management
  - Stable, economical production rates
  - Mature technology
  - Incentives
  - Emphasize competition



# Proposed Acquisition Strategy

- **Still pending AAE and DAE decisions**
- **Full and open competition**
  - Offer access to Bradley and M113 chassis and MEP for GP, MCcmd, and MCV for proposal development
  - Compete all 5 mission roles
  - Performance specification
- **Initial contract is for delta-EMD with LRIP option and option for delivery of level III technical data package**
- **GFE Bradley and/or M113 FOV chassis are available to support EMD, LRIP and FRP vehicle production if those chassis are part of winning solution**

**Pre-Decisional**



# Milestones

- **AoA – Ongoing; anticipate completion June 2012**
- **Request for Proposal**
  - No earlier than 1QFY13
  - No later than 3QFY13
- **Target production as early as FY15; as late as FY17**
- **Specific milestone entry and acquisition strategy pending future decisions**

**Total schedule driven by maturity of industry solutions and amount of qualification testing required**



# Industry Planned Events

- **Issued Market Survey Feb 2012**
  - Received feedback from multiple suppliers
  - Used to assess interest in AMPV, inform AoA, and support acquisition planning
  
- **Industry Day Events**
  - **24 April 2012**
    - Information provided by PM regarding acquisition strategy, key design requirements, AoA design lessons learned
  - **Second event planned for Aug – Sep 2012**
    - Tentative, depending on timing
    - Provide more detailed information regarding Spec and acquisition strategy
    - May provide addition technical data
  - **Pre-solicitation conference, TBD**
    - Upon authorization to release RFP
    - Detailed requirements



# White Papers



- **White Paper Topic Areas**
  - Vehicle Performance
  - Protection Solutions
  - Mission Equipment Package Integration
  - Acquisition Strategy
  - Conduct of Competition
  
- **Point of contact to follow**



# Questions

**Fill out question cards –  
answers to be posted to website**



# Contact Information

- **AMPV website:**  
<http://contracting.tacom.army.mil/majorsys/ampv/ampv.htm>
  - All questions and answers will be posted here
  
- **All AMPV Program correspondence will be handled through:**  
[usarmy.detroit.acc.mbx.ampv-program@mail.mil](mailto:usarmy.detroit.acc.mbx.ampv-program@mail.mil)
  - Email will be operational May 4, 2012
  - Look for notice on AMPV website for email activation